

# Cosmos Delay SMD

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**Based on:**

Sagan Delay  
Roland Space Echo

**Effect type:**

Triple Delay

**Build difficult:**

Advanced

**Amount of parts:**

High, total 49 components

**Technology:**

PT2399 delay

**Power consumption:**

9V

**Enclosure type:**

1790NS

**Get your board at:**

[Cosmos Delay SMD](#)

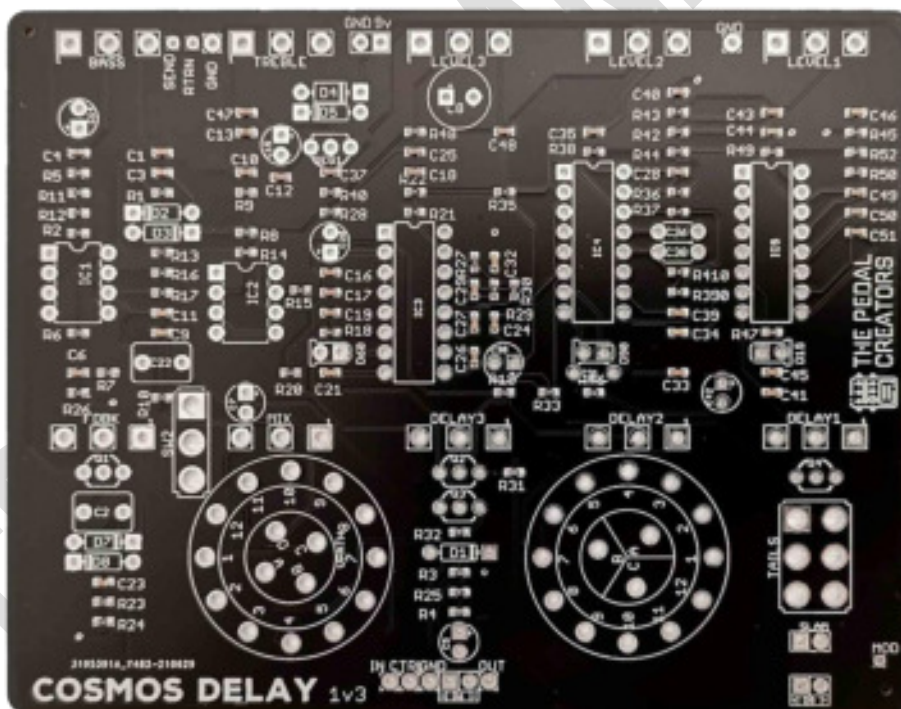
**Get your kit at:**

[Das Musikding \(Europe\)](#)

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**Project overview:**

The Cosmos Delay is a triple head PT2399 delay, inspired by Roland Space Echo, Designed by Chris Carter. Only DIY available.



# About The Pedal Creators

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**Everyone can build** excellent boutique guitar **pedals**.

Everything **we do** is to make that **experience** more accessible and **user-friendlier**.

The **Pedal Creators** series are the **best and easiest to build PCBs** ever. Including most **resistors** and **capacitors** already **soldered** on board as SMD components, leaving the key values for you to **experiment** and craft **your own tone**.

Now you can **build** a pedal you are **proud** of in **less than an hour** without any previous experience.

What are you waiting for to **become a Pedal Creator**?

## The Pedal creators - key features:

- **Easy to build**, no previous experience required. It's like Lego for musicians.
- **Fast assembly** finish a pedal in less than an hour. Play your favorite record and enjoy the ride along.
- **100% mistake-proof**. Even my grandma can build one while she cooks.
- **Build** your own boutique pedal. Experiment with different values and make the **pedal you always dreamed of**.
- Easy to scale. **Turn your passion into a money-making machine**.

# Index

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1. Project overview
2. About The Pedal Creators
3. Index, Introduction & Controls
4. Bill of materials
5. Shopping list
6. Schematic
7. Components recommendations, Build Notes, Wiring Diagram
8. Drilling Template, Licensing and Usage

## Introduction

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The Cosmos delay takes the original concept of the Roland Space Echo of 3 individual tape heads and takes it to the extreme. This circuit adds an individual delay time and volume control to each head so you can create your own rhythmic textures. If that's not enough, you even have a rotary switch in charge of synchronizing the delay heads in 4 different ways to create your galloping echo wave structures.

The Vpath rotary switch is another exclusive tool of this magnificent circuit. This knob allows you to set where you are placing the feedback loop, which you can combine with reverbs and other modulations to enlarge your spaceship.

This circuit also comes with a dry switch, tails control, and a slam switch to momentary drive your signal into fully chaotic feedback.

This is not a beginner-friendly project, and we recommend you take your time and patience to get the best possible results.

This board has been corrected and improved a couple of times, being 1v4 the final revision. All the previous versions are fully working.

## Controls

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### Potentiometers

- Bass
- Delay1
- Delay2
- Delay3
- FDBK

- Level 1
- Level 2
- Level 4
- Mix
- Treble

### Switches

- Delay
- Vpath
- Dry Sitch
- Slam
- Tails

The **VPATH** switch allows you to dial different configurations using the Send and Return loops.

**1st position:** Dry signal goes to the first opamp unaffected, while send return loop is enabled right before the mix pot.

**2nd position:** Dry signal goes first through the send return pads before entering the delay circuit. Great for using some reverbs in front of the delay.

**3rd position:** Bypasses the send return pads and goes directly into the delay circuit. To access this position, you must place jumpers in between pads 3 to 6 and 9 to 12.

The **Delay sync** rotary controls the behavior and structure of the three delay heads. Explanation below.

**1st position:** All delays are un-sync; each delay pot works independently.

**2nd position:** All delay heads are sync. Use delay 1 to control all of them.

**3rd position:** delay 1 and 2 synchronized, delay 3 independents

**4th position:** delay 1 and 3 synchronized, 2 independents

# Bill of materials

Capacitors	
Part	Value
C2	1u
C22	1u
C31	100n
C36	1n
C38	100n

Electrolytics capacitors	
Part	Value
C5	10u
C7	1u
C8	220u
C14	47u
C15	47u
C20	47u
C30	47u
C42	47u

Potentiometers	
Part	Value
BASS	100k B
DELAY1	500ka
DELAY2	500ka
DELAY3	500ka
FDBK	50kb
LEVEL1	10kb

LEVEL2	10kb
LEVEL3	10kb
MIX	50kb
TREBLE	100kb

IC	
Part	Value
IC1	TL072
IC2	TL072
IC3	PT2399
IC4	PT2399
IC5	PT2399

Transistors	
Part	Value
Q1	2N5457***
Q2	BC550**
Q3	BC550**
Q4	BC550**

Switches	
Part	Value
DCTRL (Delay Sync)	3PDT ROTARY
DRYKILL	SPDT

SLAM	SPDT MOMENTARY FOOTSWITCH
TAILS	DPDT FOOTSWITCH
VPATH	4P3T ROTARY

Regulator	
Part	Value
REG1	LM78L05*

Diodes	
Part	Value
D1	1n4148
D2	1n914
D3	1n914
D4	1n4001
D5	1n4148
D6	3mm LED
D7	1n914
D8	1n914
D9	3mm LED
LED	3mm Red LED
D15	3mm LED
D60*****	EMPTY
D90*****	EMPTY

# Shopping list

Capacitors		
Qty	Value	Parts
2	100n	C31, C38,
1	1n	C36
2	1u	C2, C22

Electrolytics Capacitors		
Qty	Value	Parts
1	10u	C5
1	1u	C7
1	220u	C8
5	47u	C14, C15, C20, C30, C42

Potentiometers		
Qty	Value	Parts
1	100k B	BASS
1	100kb	TREBLE
3	10kb	LEVEL1, LEVEL2, LEVEL3
3	500ka	DELAY1, DELAY2, DELAY3
2	50kb	FDBK, MIX

IC		
Qty	Value	Parts
3	PT2399	IC3, IC4, IC5
1	TL072	IC2
1	tl072	IC1

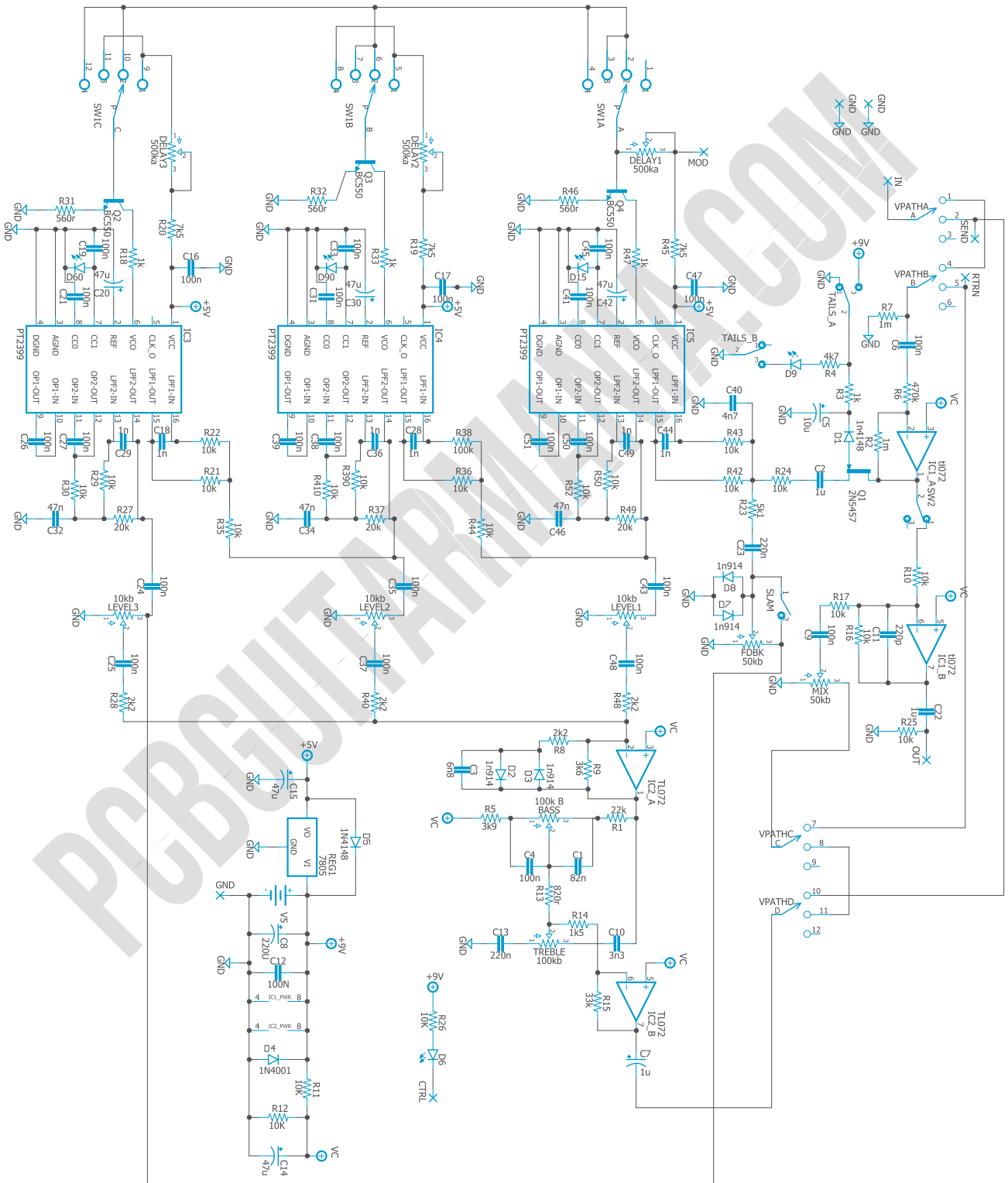
Transistors		
Qty	Value	Parts
1	2N5457**	Q1
3	BC550*	Q2, Q3, Q4

Switches		
Qty	Value	Parts
1	3PDT ROTARY	DCTRL (Delay Sync)
1	SPDT	<b>DRYKILL-SW2 (on/on) ****</b>
1	SPDT MOMENTARY FOOTSWITCH	SLAM (on/on)
1	DPDT FOOTSWITCH	TAILS - need to be jumpered in v1
1	4P3T ROTARY	VPATH

Regulator		
Qty	Value	Parts
1	LM78L05	REG1

Diodes		
Qty	Value	Parts
2	1n4148	D1, D5
4	1n914	D2, D3, D7, D8
1	1n4001	D4
3	3mm LED	D6, D9, D15
1	3mm red LED	LED
2	EMPTY	<b>D60, D90*****</b>

# Schematic



# Components Recommendations

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As many people like to experiment with some pedals with higher voltage, always ensure your **electrolytic capacitors'** max tolerance is over 25v.

This board has been tested using Film box capacitors for most of the values over 1nf and ceramics discs for those under 1nf. However, high-quality components such as Wima's Capacitors and Panasonic's electrolytics can deliver a better performance.

All the resistors used for testing this project are 1/4W Metal Film.

The BOM and Shopping list are exclusive regarding this project. It doesn't include all the hardware like the 3PDT bypass switch, audio/dc jacks, enclosure, etc.

## Build Notes

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If this is one of your first projects, I recommend you to take a look at our [Pedal Building Guide](#).

For a successful and tidy build, it's recommended the following order:

1. Resistors & diodes
2. Capacitors, starting with the smaller ones and the ceramic ones.
3. Electrolytic capacitors (always check the polarity)
4. Transistors
5. Wires
6. Potentiometers and switches
7. Off-board wiring

### VPATH ROTARY

Jumper from lug 3 to 6 and a jumper from lug 9 to 12 on the rotary.

**BC550\*** In this model you can use 2n3904, 2n5088 or BC550 flipped 180 degrees.

**2N5457\*\*** This JFET controls the On-off tails function. Feel free to experiment with others similar to J201, PF5102, and others.

### DRYKILL-SW2 (on/on) \*\*\*\*

Switch off-board.

### D60, D90\*\*\*\*\*

D60 and D90 are 3mm LED but they are actually not needed and can be omitted since D15 limits the clipping at the first delay chip. D15 should be on the pot side of the PCB.

There also doesn't seem to be any difference in sound if D7 and D8 aren't there, so they can be ignored.



## Wiring Diagram

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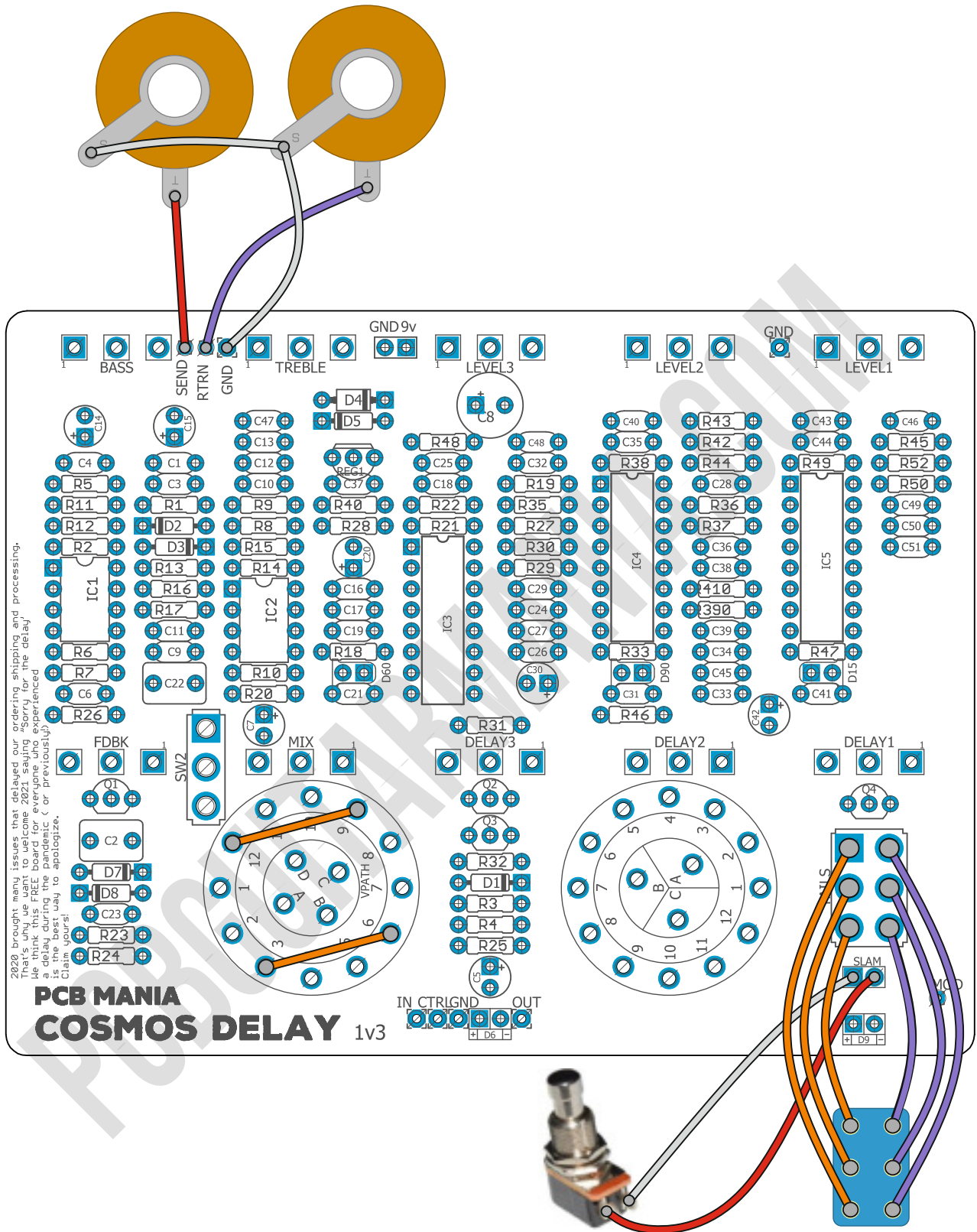
All our projects include a free 3PDT Board to make the wiring easier and tidier. Also, all of our PCBs feature the status LED on board.

The pad named “Ctrl” or “LED” is the one that controls the status of the led; wire it to the “LED” pad on the 3PDT board or in the control slug of your 3PDT.

This board has been designed to match our EZ 3PDT PCB; check it [here](#) to access our [Pedal Wiring Guide](#).

Below you can find the special off-board wiring for this pedal. The on-off bypass switch is wired as usual with our EZ3PDT board.

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On versions prior to 1v3,  
wire only the orange wires of the tail switch.

# Drill Template

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This Project has been planned to fit into a 1790NS enclosure type.

Check the Attached “Drilling templates” to drill the box properly. The files are on Scale 1:1, ready to print on an A4 page.

## Licensing and Usage

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We really appreciate your trust and support in buying this PCB, as well as your will to dive into the DIY electronics world. For us, that's why you can make this project work properly and enjoy not only the building process but also experiment and play with it on your rig.

We try to reply to every question we receive on our email or our social media. Still, we try to encourage all our customers to join our [PCB Guitar Mania - Builders Group](#) on Facebook to post all your doubts, issues, suggestions, or requests, share your builds, and have some feedback from other fellow builders and us!

We tested all our projects following this same guide on their standard configurations. Although, not all of the variations and mods have necessarily been checked. These are suggestions based on the schematic analysis and the experiences and opinions of others. Feel free to share with us your views and recommendations regarding the mods your personal experimentation.

These boards may be used for commercial endeavors in any quantity unless expressly noted. No attribution is necessary, though accreditation or a link back is always much appreciated.

If you are a builder planning to make your own run of pedals, we also offer the service of custom-made boards with your brand and logo, design according to your specifications.

The only usage restrictions are that, first, you cannot resell the PCB as part of a kit without prior arrangement with us, and second, you cannot scratch off the silkscreen or other way of trying to hide our logos and the source of the PCBs. Like it's written above, if you want to have your designs with your brand and logo, we could undoubtedly reach an agreement.

Follow us on [Instagram](#) and [Facebook](#) to stay in tune with the latest projects!